TIGHTENING DEVICE FOR BLINDS

The present invention concerns a tightening device for roller blinds, and especially roller blinds being driven by a motor.

When activating conventional roller blinds it is common that these do not have any tightening devices, something leaving the lower roller blind edge often hanging loosely or the tightening is obtained passively by the roller blind being equipped with a lower listing ensuring the tightening based on its weight.

In motorized rolling blinds, e.g. rolling binds located between isolation glass panes, this is possible, but if the motor does not stop the descent of the roller blind there may arise unsightly folds in the rolling curtain and additionally such folds may let light pass through at the edges of the roller curtain.

E.g. from US patent 6.530.414 there is known a motorized roller curtain being pulled from bottom to top and being regulated by the aid of a motor. However, there is not disclosed anything in this patent concerning the tightening of the roller curtain.

Thus there exists a need for a device that may tighten the roller blind automatically over the total length of the moving distance of the roller blind.

According to the present invention there has been obtained such a tightening device for a horizontally or a vertically running roller blind wherein the roller blind is wound out or in from a drum, and wherein the out- or in-winding from the drum is guided through the aid of belts or chains running over both ends of the drum and running from the drum to a rotational bearing for the belts or the chains, the tightening device comprising an axle located in the

free edge of the roller blind, wherein the axle runs between rollers being connected to the belts, and which, when moving the belts, are rotated and thereby rotate the axle, the axle comprising a pre-loaded spring which, when rotating the axle, applies a force on the axle pressing it in a direction away from the drum for the roller blind.

Such a tightening device may particularly be used in a roller blind system that may be mounted inside an insulation glass. In such an insulation glass there is included a frame comprising four profiles ore frame parts, one upper and one lower frame part and two side frame parts.

The frame parts include an on/off-winding mechanism for a roller blind. The frame parts may additionally be designed so they together form a profile frame for an insulation glass. The roller blind per se is wound onto an axle/pipe in the upper horizontal profile part. The "free" end of the roller blind is secured to a bottom listing which through a special mechanism is connected to two cog belts in the side profiles. This special mechanism has the effect that the bottom listing with the free end of the roller blind is pushed away from the axle/pipe in the upper profile part, and the roller blind will on account of this be tightened to hang straight.

The winding mechanism includes a pipe being located inside the upper frame part. In each end of the pipe there is mounted a cog belt disc. Over each of the two cog belt discs there is located a cog belt that passes downwards along the two side frame parts to a cog belt wheel in the other end of the side frame part.

Onto the pipe there is wound a foil or a curtain. The free end of the foil or curtain there is secured a bottom listing which in principle hags feely inside the frame.

Internally inside the bottom listing there is mounted a penetrating rotational axle. This axle is spring-loaded (torsion spring). On the axle there are mounted two cog wheels cooperating with two cog belts running along the two perpendicular profiles in the profile frame. The two cog belts move substantially synchronically with the on- or off-winding of the foil/blind on the pipe. This relative movement passes the bottom listing along up or down inside the frame. The spring-loaded axle in the bottom listing ensures that the bottom listing, through the two attached cog belt wheels, attempts to move away from the pipe so that the foil or blind is tightened to hang straight between the pipe and the bottom listing irrespective of where in the frame the bottom listing is located.

The invention will below be illustrated with reference to the enclosed figures that show an embodiment of the tightening device according to the invention mounted inside a profile frame, and wherein

Fig. 1 shows the frame wherein the whole roller blind mechanism is mounted. 1 is the upper horizontal profile. 4a and 4b are the two perpendicular profiles, and 5 is the lower horizontal profile. 16 are corner pieces assembling the corners in the profile frame.

Fig. 2 shows the same frame parts 1, 4a, 4b and 5 as in fig. 1, but sectioned so that the roller blind mechanism also is displayed.

Fig. 3 shows a detailed figure for the lower bottom listing and the axle in the roller blind.

The roller blind 17 is wound up onto an axle/pipe 18. In each end of the pipe 18 there is secured a cog belt wheel 2a,2b. The connection between the cog belt wheels 2a,2b and the pipe 18 is in the displayed embodiment braced with two pins 3a,3b. The cog belt wheels 2a,2b lie in bearings

inside two bearing supports 19a,19b. These are secured to the two perpendicular parts of the frame 4a,4b.

Correspondingly, there are two cog belt wheels 6a,6b, two bearing supports 19c,19d at the other end of the two perpendicular profile parts 4a,4b.

The cog belt 12a runs over the cog belt wheels 2a,6b inside the perpendicular profile 4b. Similarly the cog belt 12a runs over the cog belt wheels 2a,6a inside the perpendicular profile 4a. The cog belts may be endless or non-endless. In a special embodiment the cog belts are non-endless.

A motor mounted inside the lower horizontal profile 5 and is connected to the cog belt wheel 6a. When the motor turns in one or the other direction, the wheel 18 will thereby rotate and the roller blind is wound onto of off the pipe 18.

The free end of the roller blind is secured to the bottom listing 8. Inside the bottom listing 8 there is a penetrating axle 9. A torsion spring 11 is running between the axle 9 and the bottom listing 8. In each end of the axle 9 there is secured a cog belt wheel 10,10a. These two cog belt wheels 10,10a cooperate with two cog belts 12,12a running along the side frame profiles 4a,4b.

The spring 11 is pre-loaded so the it will rotate the axle 9 in a direction so that the bottom listing is pressed down and away from the pipe 8. The roller blind 17 will thus be tightened. The cog belt wheels 10a,10b are mounted on some free holders sliding inside a groove 4aa,4bb in the perpendicular profiles 4a,4b.

When the pipe 18 is rotated and the roller blind is wound off or onto the pipe 18, the cog belts 12a,12b will also mode up or down inside the profiles 4a,4b. The cog belts

will draw along the bottom listing 8. The torsion spring 11 will transfer a rotating force to the axle 9 which in its turn will rotate the cog belt wheels 10,10a. This movement will press the bottom list down and tighten the roller blind.

The tightening device according to the invention may be used in a roller blind system being collected in a frame that may function as a distance frame for an insulation glass system.

The bottom listing is secured in the free end of the roller blind material and has an integral axle with a spring mechanism wherein any or the one end of the axle has mounted a cog belt wheel which cooperate with the one or both the cog belts running inside the two side profiles.

The curtain material is wound up on a pipe that is not carried on a solid or rotating axle, but has a bearing at each end.

Cog belts in the side profiles are moved synchronically with the rotation of the pipe onto which the roller blind is wound.

The invention may be used in a profile frame wherein each part is designed so that it may include a motor while there simultaneously being room for an amount of a molecular sieve (drying substance, desiccating substance) that is required for an insulation glass.